



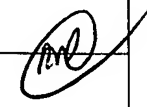
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,700	03/22/2004	Toshiro Kawanishi	10844-46US (204002(E-1))	8787
570	7590	03/03/2006	EXAMINER	
AKIN GUMP STRAUSS HAUER & FELD L.L.P. ONE COMMERCE SQUARE 2005 MARKET STREET, SUITE 2200 PHILADELPHIA, PA 19103			HOFFBERG, ROBERT JOSEPH	
			ART UNIT	PAPER NUMBER
			2835	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/805,700	<b>Applicant(s)</b> KAWANISHI, TOSHIRO	
	<b>Examiner</b> Robert J. Hoffberg	<b>Art Unit</b> 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 3/22/2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-288 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-288 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/22/2004 2/4/2005</u> | 6) <input type="checkbox"/> Other: _____  |

***Detailed Action***

***Specification***

1. The disclosure is objected to because of the following informalities: page 13, line 9, "50 to 100 A" should be "2 to 10 A".

Appropriate correction is required.

***Drawings***

2. Figures 4 and 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, 7, 11, 13 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshiaki (JP 2002-150906).

With respect to Claim 1, Yoshiaki teaches a thermal fuse having a function of a current fuse in which a low-melting fusible alloy piece (Fig. 1a, #4) having an alloy composition containing 40 to 70% Bi (see claim 1) is connected between a pair of flat lead conductors (Fig. 1a, #3), a flux (Fig. 1a, #5) is applied to said low-melting fusible alloy piece, and said flux-applied low-melting fusible alloy piece is sandwiched (see Fig. 1b) between a resin base film (Fig. 1a, #11) and a resin cover film (Fig. 1a, #12) to provide insulation, wherein a resistance of said low-melting fusible alloy piece is set so as to enable said low-melting fusible alloy piece to be fused off also by Joule heat due to an allowable maximum current of a secondary battery.

With respect to Claim 5, Yoshiaki further teaches that said pair of flat lead conductors, and said flux-applied low-melting fusible alloy piece which is connected between upper faces (Fig. 1b, #3 top) of tip end portions (Fig. 1a, #3 near #4) of said lead conductors are sealed (Para. 0013, closed) with being vertically sandwiched (see Fig. 1b) between said resin cover film and said resin base film.

With respect to Claim 7 and 11, Yoshiaki further teaches a balance of the alloy composition containing 40 to 70% Bi is In and inevitable impurities (see Claim 2).

With respect to Claim 13 and 17, Yoshiaki further teaches a balance of the alloy composition containing 40 to 70% Bi is In, inevitable impurities, and 0.05 to 5% of at least one of Ag (claim 2), Cu, Au, Sb, Ni, Pt, Pd, Ge, and P.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 6, 8, 12, 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiaki (JP 2002-150906).

With respect to Claim 2, Yoshiaki further teaches wherein a melting point of said low-melting fusible alloy piece is 85 to 95° C. (abstract). While Yoshiaki fails to teach the allowable current, it would have been obvious to one in the art at the time of the invention that the cross section of the fusible alloy and lead conductors can be selected to allow any maximum current including and the allowable maximum current is a current of 2 to 10 A for a period 1,000 seconds before heating above melting point of the fusible alloy.

With respect to Claim 6, Yoshiaki further teaches that said pair of flat lead conductors, and said flux-applied low-melting fusible alloy piece which is connected between upper faces (Fig. 1b, #3 top) of tip end portions (Fig. 1a, #3 near #4) of said lead conductors are sealed (Para. 0013, closed) with being vertically sandwiched (see Fig. 1b) between said resin cover film and said resin base film.

With respect to Claim 8 and 12, Yoshiaki further teaches a balance of the alloy composition containing 40 to 70% Bi is In and inevitable impurities (see Claim 2).

With respect to Claim 14 and 18, Yoshiaki further teaches a balance of the alloy composition containing 40 to 70% Bi is In, inevitable impurities, and 0.05 to 5% of at least one of Ag (claim 2), Cu, Au, Sb, Ni, Pt, Pd, Ge, and P.

5. Claims 3-4, 9-10 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiaki (JP 2002-150906) as applied to the above claims, in view of Kawanishi (US 6,040,754).

With respect to Claim 3 and 4, Yoshiaki further teaches that front end portions (see Fig. 1b, #3 lower surface) of said pair of flat lead conductors are secured to a rear face (Fig. 1b, #11 upper surface) of said resin base film, a part of each of said front end portions is exposed (Fig. 1b, contact surface of #3 and #4 and Fig. 2) from a surface (Fig. 1b, #11 upper surface) of said base film, said low-melting fusible alloy piece is connected (see Fig. 1a) between said exposed parts (Fig. 1b, contact surface of #3 and #4 and Fig. 2), the flux is applied to said low-melting fusible alloy piece, and an area above (see Fig. 1b) said base film is sealed (Para. 0013, closed) by said resin cover film. Yoshiaki fails to teach front ends of the flat lead conductors, rear surface and a surface of the resin base film. Kawanishi teaches that front end portions (see Fig. 2b, #2 upper surface) of said pair of flat lead conductors are secured to a rear face (Fig. 2b, #11 lower surface) of said resin base film, a part of each of said front end portions is exposed (Fig. 2b, contact surface of #2 and #3) from a surface (Fig. 1b, #11 upper surface) of said base film. With respect to Claims 9-10, Yoshiaki further teaches a balance of the alloy composition containing 40 to 70% Bi is In and inevitable impurities (see claim 2). With respect to Claims 15-16, Yoshiaki further teaches a balance of the alloy composition containing 40 to 70% Bi is In, inevitable impurities, and 0.05 to 5% of at least one of Ag (see claim 2), Cu, Au, Sb, Ni, Pt, Pd, Ge, and P. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify

the fuse of Yoshiaki with that of Kawanishi to use a low-melting fusible alloy piece manufactured from a non-hazardous alloy with the desired mechanical properties.

6. Claims 19-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiaki (JP 2002-150906) in view of Kawanishi (US 6,040,754) as applied to the above claims, and further in view of Izaki et al. (US 2002/0113685).

With respect to Claims 19-36, the applicant's prior art and/or Yoshiaki teaches a thermal fuse according to any of the claims 1 to 18. Yoshiaki fails to teach the fuse resistance. Izaki et al. teaches a resistance of said low-melting fusible alloy piece is 4.5 to 50 m  $\Omega$  (Para. 0188, line 13). It would be obvious to one skilled in the art to select the resistance based upon the desired operating conditions and select an alloy, cross section and length that the desired resistance. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the fuse of applicant's prior art with that of Yoshiaki to select the resistance of the low-melting fusible alloy based upon the desired operating conditions and select an alloy, cross section and length piece to be 4.5 to 50 m $\Omega$  or any other value to provide for the desired heat dissipation before the low-melting fusible alloy melts.

7. Claims 37-288 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiaki (JP 2002-150906), in view of Kawanishi (US 6,040,754), and further in view of Izaki et al. (US 2002/0113685) as applied to the above claims.

With respect to Claims 37-72, the applicant's prior art, Yoshiaki and/or Izaki et al. teaches a thermal fuse according to any of the claims 1 to 36. They fail to teach the ratio of the fuse. Kawanishi teaches a ratio d/t of an outer diameter d (Col. 3, line 45,

100/500  $\mu\text{m}$ ) of said low-melting fusible alloy piece to a thickness  $t$  (Col. 3, lines 51-52, 50/200  $\mu\text{m}$ ) of each of said flat lead conductors is 2 to 5 (ratio of 2 at minimum,  $2\frac{1}{2}$  at maximum condition). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the fuse of applicant's prior art with that of Yoshiaki in view of Izaki et al. with that of Kawanishi for the purpose of selecting a cross section of the flat lead conductors to be 2 to 5, or any other value to the diameter of the low-melting fusible alloy to allow the lead conductors to absorb the initial surge current prior to the fuse temperature obtaining the melting point of the fusible alloy piece.

With respect to Claims 73-144, the applicant's prior art, Yoshiaki, Izaki et al. and/or Kawanishi teach a thermal fuse according to any of the claims 1 to 72. They fail to teach the overall thickness of the fuse. Kawanishi further teaches a thickness from a lower face of said resin base film to an upper face of said resin cover film is 2.0 mm or smaller (sum of 50/500 $\mu\text{m}$  for #11, 50/200  $\mu\text{m}$  for #2, 100/500 $\mu\text{m}$  for #3, 50/500 $\mu\text{m}$  for #12, total of 1.7mm maximum). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the fuse of applicant's prior art with that of Yoshiaki, in view of Izaki et al. and in further view of Kawanishi for the purpose of having an overall thickness to fit within the battery pack housing.

With respect to Claims 145-288, the applicant's prior art and/or Yoshiaki, Izaki et al. and/or Kawanishi teach a thermal fuse according to any of the claims 1 to 144. They fail to teach that the lead conductors are nickel or an iron alloy. Kawanishi further teaches said flat lead conductors are made of nickel (Col. 3, line 50) or an iron alloy. It would have been obvious to one of ordinary skill in the art at the time of the invention



was made to modify the fuse of applicant's prior art with that of Yoshiaki, in view of Izaki et al. and in further view of Kawanishi for the purpose of maximizing the current to the fuse element and minimizing the thermal resistance of the balance of the fuse including the lead conductors.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert J. Hoffberg whose telephone number is (571) 272-2761. The examiner can normally be reached on 8:30 AM - 4:30 PM Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RJH *RyH*

  
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